# The MAC Flyer

JULY 1974

**Wings of Flight: Badges of a Profession.**
**Page 3.**

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# The MAC Flyer

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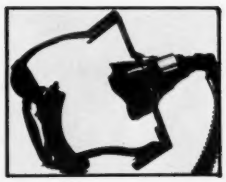
For Greater Efficiency
in MAC Air Operations

JULY 1974 MAC RP 127-5 VOL XXI, NO. 7



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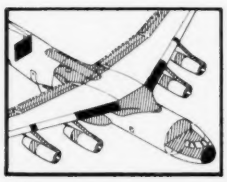

24

Flying Safety Writing Contest Winners ..... 3

Professionalism in Aviation ..... 4

Rapid Decompression ..... 8

Comments Heard While Taxiing ..... 10

Good Show ..... 12

Keep It Right Side Up! ..... 13

Roll of Honor ..... 16

HF Hangups ..... 18

Sling Wing Things ..... 20

The Perfect Pilot ..... 23

Honeycomb — For You and the Bees ..... 24

C. R. Terror ..... 25

Quick Stoppers ..... 28

COVER: Pilot, navigator and aircrew member wings signify the skill, achievement, dedication and integrity of those who wear them.

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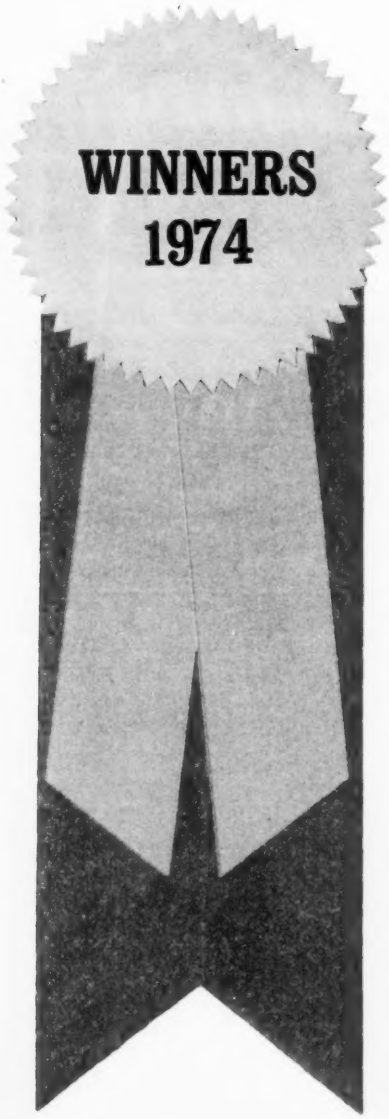
# Flying Safety Writing Contest Winners




"Professionalism in Aviation," by 1Lt Michael E. Humphreys of the 1550 ATTW, Hill AFB, Utah, has won the top spot in the 1974 MAC Safety Writing Contest sponsored by THE MAC FLYER.

Lt Humphreys' comprehensive article explores the meaning of air discipline. In it he discusses various attitudes and his own views on this many faceted subject.

Second place went to Capt Steven H. Findeiss of the 40 ARRS, Nakhon Phanom RTAFB, Thailand, for "Dollar Ride with the Old Man," a glance backward from a MAC transport flight of the future to the antiquities of flying during the 1970's.

Maj Arthur Covello of the 514th MAW (Assoc), McGuire AFB, N.J., placed third with "Our Magellan," an engrossing tale of two navigators, one brandishing supreme confidence, and a second who is unwilling to take anything for granted during an overwater flight.

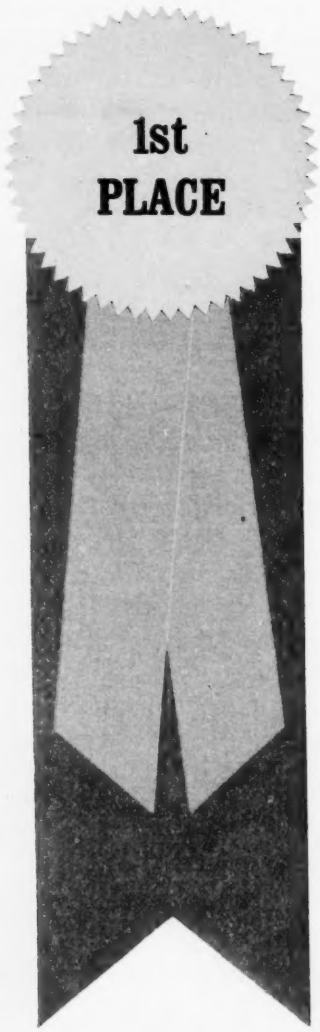
The three honorable mentions in the neck-and-neck contest are: "Unidentified Extra" by Maj William F. Schroeder of the 76 MAS, Charleston AFB, S.C.; "The Fine Print" by Capt Jack D. Lodato of the 301 MAS (Assoc), Travis AFB, Calif.; and "Checkitis" by Maj Clarence C. Campbell of ARRS/DOQ, Scott AFB, Ill.

Authors of the first three winners will receive engraved walnut desk sets. Authors of the stories selected for honorable mention will be awarded engraved walnut plaques.

The articles were judged on the basis of their flying safety message, originality, suitability for publication in the magazine, interest to readers, readability, quality of writing, and conformity to instructions as published in THE MAC FLYER.

A winning entry will be published in THE MAC FLYER each month, beginning with this issue.

# Professionalism in Aviation:




# Some Thoughts on Air Discipline

## Here's what it means to one pilot. What does it mean to you?

by 1/Lt Michael E. Humphreys
1550 ATTW, Hill AFB, Ut

A poll of the flying personnel of any organization on the term "air discipline" will produce almost as many definitions and variations as there are contributors. My first encounter with the term was shortly after coming to MAC, my second operational assignment. I never encountered the term air discipline, to my knowledge, while flying in Southeast Asia. My acquaintance came when a new squadron commander signed in shortly after my own arrival. During crew and safety meetings, the term took on an attention-getting ring as he pounded it with a verbal hammer. I decided I should find out what it was about.

Originally I set out merely to solidify some rather vaporous ideas on the subject and satisfy my own curiosity. The more I explored the subject, the more intrigued I became. I have not intended this to be an article-by-committee, but I have taken the liberty of drawing on the resources of aviation experience around me to help crystalize some thoughts and attempt to distill the essence of air discipline. I have concluded that devising an all encompassing definition which would satisfy every-

one would be difficult. It is always easier when working with the intangible to give examples of what it is or is not. But however elusive a complete description may be, air discipline is real enough. What follows is a collection of thoughts on the subject — some original and some not.

**Air Discipline vs. Professionalism**

In the mind of most Air Force pilots, air discipline and professionalism are very closely related if not synonymous. Gen William Westmoreland expressed the very core of professionalism when he said that "It is the attainment of excellence through education, experience and personal dedication. It is characterized by fidelity and selfless devotion which presupposes self-discipline, great skill, extensive knowledge, and willingness to abide by established military ethics." My thoughts could be summed up by saying that air discipline is professionalism in aviation, . . . except that it would leave a few things unsaid.

**Discipline, Imposed**

A pilot remarked to me once, "What they should do is rescind all the regulations and just say, 'Use good judgment.'" He was tired of being "confined" by regulations. Imposed discipline is very much a part of the military way of life. I've never felt much toward the guy who complains because he can't have his hair down past his collar and has to shine his shoes. When he cashes his check, he is tacitly saying that he accepts the regulations by which he is governed. Generally, imposed discipline is merely "good judgment" written down. It is often written to take the place of subjective judgment in questionable areas when experience has proven the imposed discipline a safer means of operation.

However, abuse of the right to make a subjective judgment is often the bogey that results in "overly-restrictive" regulations. But what can one expect? We have recent incidents like the transport pilot in another command who made an unauthorized training flight with unauthorized passengers aboard (one, a female civilian) and crashed doing an unauthorized maneuver, killing several people. That wasn't a lack of air discipline — that was malfeasance. Talk about abolishing regs and resorting to "good judgment" and people point to episodes like this. There is always, however, the AF Form 847 for those regs which honestly do not aid and support our flying operations. However, if we read a new restriction in the FCIF prior to flight, grumble in our coffee during the briefing, and do nothing about it, we deserve what we get.

**Discipline, Self**

In the formula for air discipline, self-discipline is a basic factor. Someone once said that the most professional guy in the world is the pilot on the receiving end of a check ride. But more accurately, self-discipline is the force that causes a man to function in the same professional manner when not being watched. What is the difference between a helicopter pilot who flies a VFR cross-country as planned and one who departs from directives and good sense by flying on the deck chasing coyotes?

The obvious answer of self-discipline is demonstrated by the man who knows he may never be found out but whose self-control and airmanship demand that he fly by directive and good operating procedures (and common sense). Of course, the **self** aspect doesn't just apply to the great departures from air discipline. For most professional, disciplined aircrew members, it is the daily routine that exposes our "Achilles' heel." The fatigue of a long flight, the complacency that comes from the boredom of having done the same thing a thousand times before — these are the places where Paris (the guy who got Achilles) hurls his fiery darts.

One more thought on self-discipline. There is a Biblical proverb that says "A man who cannot rule his own spirit is like a city with its walls broken down." It may be very tempting to take a chance, to press at minimums, to omit part of the briefing because you know your wingman knows what to do. You may get away with it — a hundred times. But if you continue to do it, and do it often enough, the walls of your air discipline become eroded and start to break down and then you fall into the Hot-Stick Syndrome, i.e., "I'm not really in position and kinda far out, but I can make it," or, "I can handle that gust spread, I've landed in worse," or, "200 and 1/2 — ah, that's for new guys." You become

a major accident looking for a place to happen.

**Breaches**

I have a theory that breaches of air discipline, could they be measured, would vary directly with the opportunity to do so. A large aircraft with a multi-member crew flying a standard mission from one runway to another may experience less occasion to violate air discipline. The same aircraft and crew in different circumstances — perhaps an infrequently flown training mission with some compounding problem — might respond differently when confronted with an unforeseen circumstance or the temptation to contravene the norm. Each mission must be evaluated by the individual factors that affect it. What will we do if X, Y, and Z occur? Divert? Make a 180? Or press on? There is a variation of "Murphy's Law" for aircrew members that goes, "If it can happen while flying a mission, sooner or later it will." We need to approach every mission with a plan for the unexpected. How will we react to times of stress and duress? I recall reading in a safety magazine about some guys in a two seater who had smoke and fumes in the cockpit followed by an electrical fire. The article stated they eventually did the right thing — punched out. It also stated that at no time did they open a checklist or attempt to isolate the fire by pulling circuit breakers. No attempted corrective action — they just got out. There should have been a Chinese Proverb which said, "One doesn't know what's in a pot until it boils." No one can predict for certain how a man will react when the chips are down. But standardization, training, proper supervision and continued emphasis on air discipline can minimize adverse reactions in times of stress.

What about intentional breaches of air discipline? If you have determined that only some rules apply to you and that you can get away with things other pilots can't, or if you have determined that you are going to violate some aspect of air discipline, you should inform the safety officer at each base where you intend to take off or land. He can evacuate your operating area and have a film crew standing by. Sooner or later he is bound to get some spectacular footage.

**Barriers to Breaches**

A psychologist has said that most of the positive responses we experience toward other people come from three motivating factors: Fear, Love and Respect. These same factors may affect, to some extent, our reaction to air discipline.

**Fear of Being Found Out.**

When I was young, a seemingly inviolate principle was at work in my life. Almost inevitably, when I picked up a toy in a store, "borrowed" a friend's bicycle or got hold of something I shouldn't have, I broke it. Then I had to shamefacedly explain my unauthorized handling. Finally, I learned to keep my hands to myself through fear of the results if I didn't.

To refrain from breaching a known directive because of fear of being caught is not the best motivating factor for air discipline. But if it works, so be it. The problem arises when one thinks he won't get caught. Refer to the section on self-discipline for the end result of that philosophy.

**Love**

You're on a mission and want to get home. You haven't seen your family for two weeks; or tonight is your anniversary and you promised your wife you would take her to dinner. The weather at home plate has been at or below minimums all day. You start the approach and at decision height don't break out — do you press or go missed approach? Love, a motivation for air discipline? You bet! You go missed approach because you love your family and you don't want to make your wife a widow.

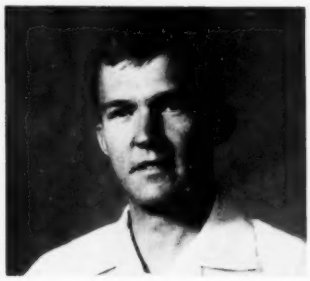
**Respect**

This may be the foremost of these three motivators. Most of us respect ourselves, our work, our supervisors and other aircrew members. The thought of being unprofessional is something we can't tolerate. And because we respect our supervisors and fellow aircrew members, we extend to them the courtesy of following a predictable pattern of aviation behavior. At the same time, we desire that they respect our professionalism and air discipline. Professional respect develops a cohesion which can "make" an entire unit. The lack of it can tear apart an outfit overnight.

**A Word to Supervisors**

The question has arisen, can a man be undisciplined and unprofessional on the ground and

**ABOUT THE AUTHOR**



Lieutenant Humphreys graduated from OTS in 1970 and shortly afterward entered UHT. After completing a combat tour with the 21st SOS, Nakhon Phanom RTAFB, Thailand, he assumed his present job as aircraft/simulator instructor in HH-53's at Hill AFB, Utah. He has more than 1,000 hours in helicopters.

become air disciplined once he steps aboard the aircraft? The general concensus of the pilots and supervisors to whom I have talked is no. There may be exceptions, but basically what we are on the ground affects very much what we do in the air. After all, we spend only a small portion of our time actually in the aircraft. It is interesting to me that Air Force recruiters are now checking prospective enlistees for traffic tickets. It seems there is some correlation between a man's driving record and how well he may react to military life. A supervisor should take note of an individual who exhibits a lack of, or disregard for, ground discipline and professional behavior, whether it be excessive traffic tickets or AFM 30-1 standards. If he is unprofessional on the ground — what makes you think he will change in the air?

Another thought for supervisors: no one is born with air discipline. No one is graduated from UPT with a sense of air discipline unless he has been taught it. Air discipline is a flying skill. Like all skills it requires a certain amount of proficiency to maintain it. Air discipline must be taught, and to imbue a flying unit with it is a continuing educational process.

**The Paid Professional**

Is there a basic difference between the Air Force pilot and the civilian airline pilot? If there is, I think it lies here. The civilian airline pilot flies the mission as the company pays him to fly, no more or less. He is a paid professional. His job and livelihood depend on how he flies the aircraft and his compliance with company directives. We bluesuiters, on the other hand, sometimes feel that when we sign for an aircraft it's ours to do with as we please. It is often this mental attitude that is a springboard for undisciplined and unsafe decisions. Witness the guy who makes the unauthorized single engine approach over the protests of his backseater and winds up in a ball of flames. Maybe we ought to step back and take another look. What would our reaction be if we were a business man who owned the airplane. How would we want the mission done? Obviously as safely and economically as possible. So why shouldn't we fly it that way? In peacetime we are paid to fly the mission, not to press and not to take chances. In other words, be a paid professional.

I will not guarantee the foregoing 100 percent waterproof. I have not attempted to weave some bulletproof fabric that can't have holes shot in it, but merely to offer some thoughts on the subject. I don't have all the answers.

But if these thoughts prove useful to you, if they stimulate you to take a fresh look at air discipline, then they will have lit a candle of understanding. Hopefully, it will shed a little light on the path of aviation safety and produce in us, in the words of World War I ace, Group Commander Harold E. Hartney, "that dearest commodity in a leader of fighting men, a thorough knowledge of his profession, gained by experience."

# *Rapid Decompression -*

Say it couldn't happen to you? Think again. Several MAC crew members have suffered hypoxia during decompression within the last few months.

Whether you're on a cargo or patient run, oxygen discipline is a must.

# —or, Bursting Bubbles

Ask any five year old what happens to a balloon when he sticks it with a pin. Ask any jet driver what happens to his pressurized air machine when a window or door ruptures at flight level 390. In the former, nothing except a loud bang. But in the latter, the lives of your crew (and your passengers) could hang in the balance.

Most of MAC's first-line transports, the C-141's in particular, have racked up a lot of air miles since rolling out of the showroom. Thousands of landings, countless pressurization cycles, turbulence, grossed out takeoffs, and the corrosive effects of nature all have adversely affected aircraft components. And MAC is not alone with this problem. Recently, a C-141 and two non-MAC aircraft experienced rapid decompression.

**Hypoxia Strikes**

A four-engine jet, en route to its stateside base from overseas, departed flight level 350 for 390 because of adverse headwinds. After slightly more than a half hour at 390, the right aft scanning window on the aircraft exploded into a crescendo of fog and flying debris. The aircraft commander ordered the crew on oxygen and requested emergency descent clearance to 10,000 feet. The crew reacted immediately and most donned their masks almost instantly. But three crew chiefs, one on headset, were sleeping when the decompression occurred. Although their oxyen equipment was within reach, the three became hypoxic before they could use their equipment. The time of useful consciousness at FL 390 is about 20 seconds. Crew members revived the crew chiefs during the emergency descent and the aircraft landed without further problems.

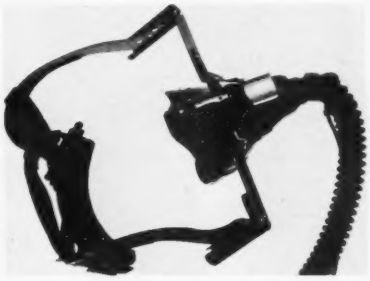
**Starlifter Blows**

Loss of pressurization on the C-141 was less dramatic but serves to alert the unwary. Climbing through 18,500 feet, a C-141 experienced a rapid decompression. The aircraft commander directed the crew to don oxygen masks, declared an emergency, and descended to 13,000 feet. A flight engineer and the senior loadmaster, surveying the Starlifter for damage, reported that the aft ramp was open and that the ramp locks appeared to be open. No hypoxic symptoms were experienced by any of the crew and the AC made an uneventful recovery.

In the most serious case, an aircraft cruising at flight level 390 experienced an explosive decompression due to failure of the aft scanning window. One man was killed and several passengers experienced hypoxia. A vigorous one-time inspection on window ports of MAC affected aircraft has been completed in an effort to prevent a similar mishap.

**Oxygen Discipline**

It's obvious that some of our birds are beginning to suffer from the effects of old age, and oxygen discipline must be stressed more than ever. Crews who fly aircraft with the new sweep-on oxygen masks have a definite advantage over those who must struggle



New "sweep on" mask.

with cumbersome jungles of wiring and oxygen plumbing on older equipment. Flying an aircraft while quarterbacking a decompression emergency and donning an oxygen mask is a difficult task to perform in 15 to 25 seconds. Scrambling from the crew bunk to an oxygen mask is also another tricky operation. So if you plan to fly high, have your oxygen gear immediately available every time, all the time. Then if your aluminum bubble bursts, you'll be in excellent shape to hang in there and fly another day.

# Comments Heard

"Hey engineer, was there anything in the forms?"

"I thought they had JP-4 here."

"Let's go. We'll get the radar fixed next stop."

"I think he said 3,000 feet. He'll correct it if we're wrong."

"Copy the clearance. I'll finish the checklist."

"...current altimeter setting is 29.85."
"Roger, 29.58."

"We can easily top that weather."

"Nav, could I use your number four chart? Mine is clipped to the glare shield blocking the sunlight."

"My attitude indicator is working fine. Let's go."

"We'll write it up next leg."

# While Taxiing

"If we hurry, we can make happy hour."

"Should be enough fuel to get us there."

"Anybody got a pencil? I gotta copy the clearance."

"Probably in a blind spot—it'll work in the air."

"Bring me a cup of coffee. I spilled the first one."

"Aww, we can take off downwind."

"Don't worry, we've got extra hydraulic fluid on board."

"We gotta go. Can't afford another delay."

"Don't sweat it, the engineer's got a gage."

"No sweat taxiing here, the ramp's always clear."

# Maj Fleek and Crew

GOOD SHOW

Left to right: TSgt Emory L. Craig, pole operator; SSgt Sidney N. Green, winch operator; Sgt Dan Adams, photographer; Maj Thomas R. Gainer, copilot; and Maj Bluford B. Fleek, pilot. Not pictured: Thomas E. Grey, civilian tech rep.

What began as a routine Mid-air Retrieval System (MARS) mission on March 14 turned into a harrowing experience for Maj Bluford B. Fleek and his CH-3 crew.

Maj Fleek's helicopter was descending at 1,000 feet per minute, positioning for a hookup with a drone 15 miles from shore over the Gulf of Mexico. Normally, the Jolly Green hooks the drone at about 10,000 feet after the drone's main chute has fully blossomed. The hookup is accomplished through the use of two poles rigged to the back of the helicopter. A rope and cable rig is attached in a manner which allows it to catch an engagement chute. The tug on the line releases the main chute and deploys a stabilization chute which starts the cable reeling out of the preprogrammed winch.

In this instance, however, the Jolly Green caught the drone but the stabilization chute failed to open. The drone, without a stabilization chute to steady it, began oscillating below the helicopter. At one point it swung up ahead of the chopper.

Quickly implementing emergency procedures, the crew pulled the drone to within 75 feet of the aircraft with the winch. Here it began gyrating in a wild series of figure eights, swinging from side to side. Deciding not to jettison the half million dollar drone, Maj Fleek radioed Tyndall AFB to have the aerodrome officer (AO) position himself and his radio controlled truck near a grassy recovery area between two runways.

After bringing his helicopter and its load back to the field, Maj Fleek established a hover at an altitude of 500 feet. Slowly descending the helicopter, he lowered the drone to the ground, using the AO's transmissions as guidance. What had been a tense flight once again became routine after the drone settled softly to the ground.

The quick analysis and skillful actions by Maj Fleek and his crew prevented possible aircraft damage and saved a valuable aerospace drone.

For your professional action, THE MAC FLYER says "Good Show," Maj Fleek and crew.

by Capt A. R. Barbin, Associate Editor

When turbulence thrashes your machine around the sky, know what to do with your flight controls or you could get in over your head.

# Keep It Right Side Up!

Aircrews realize that thunderstorms are hazardous to aircraft and most crews are careful to stay in the clear. But sometimes an unfortunate crew wanders into the tentacles of a cumulo nimbus and the going really gets tough.

Just what is a pilot supposed to do when his machine is being tossed about by a vicious weather cell, clear air turbulence, or some other type of turbulence? As in any other emergency, aircraft control demands first priority. Yet

# Keep It Right Side Up!

many of the indicators that a pilot relies upon to control his bird during normal instrument flight become erroneous during turbulence.

### Instrumentation

The only cockpit instruments unaffected in turbulence or thunderstorms are the control instruments — the attitude indicator and engine power indicator(s) — because they are completely independent of external aircraft inputs.

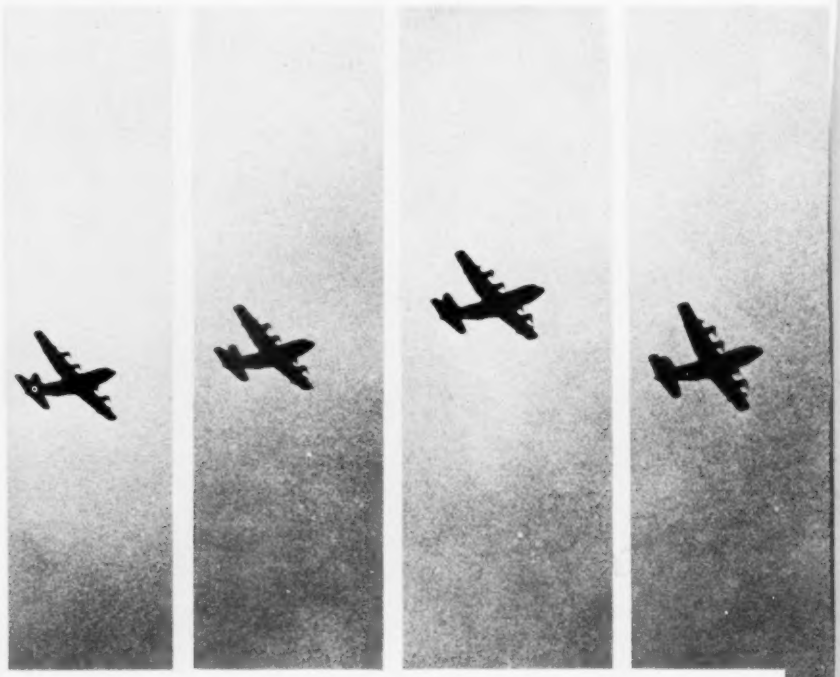
Therefore, as we all learned at one time or another, the primary references during airborne turbulence must be attitude and power instruments. In short, set cruise power and keep the artificial horizon as level as possible. And another thing, don't touch the trim while in turbulence.

### Trim Use

You'll recall that during your pilot training days, early flight instructors stressed proper aircraft trim. They took fiendish delight in tongue-lashing unwary fledging pilots who, for only an instant, allowed a mistrim condition. Instructors possessed a capacity for making students feel as though they were losing control of the aircraft if it so much as quivered from its flight attitude. Such "harassment" had a purpose. Pilots quickly learned to keep their aircraft trimmed all the time. But now we know there are times when it would be wise and prudent to refrain from trimming your bent wing beauty.

During the early days of jet transport operations, little was known about high altitude turbulence or turbulent upsets. A number of jet transports were upset in turbulence and failed to recover.

Investigators at crash sites found some rather curious, and perplexing, bits of wreckage. For instance, at some crash sites, throttles were found fully advanced and the horizontal stabilizers trimmed nearly full nose down. At others, throttles were in the idle position and trim was full, or nearly full, nose up. But why did such abnormal control extremes exist? What kind of turbulent conditions would cause a pilot to configure his aircraft in such an unorthodox manner? A simplified look at a thunderstorm cross section helps answer these questions and also explains the why of trim procedures and guidance contained in Dash Ones.

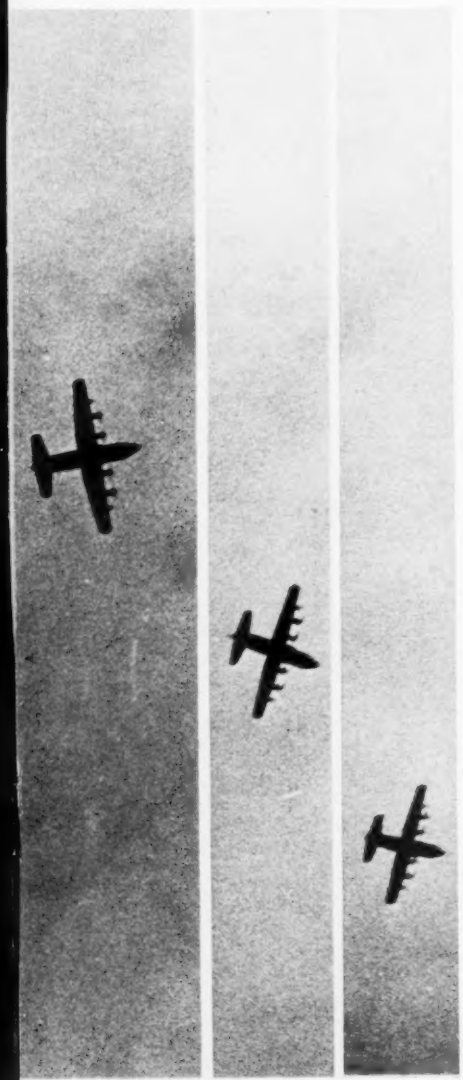


### Going Up or Down

Vertical air currents can catapult a four-engine jet upwards or downwards at dizzying speeds. Many cells contain both severe updrafts and downdrafts. Consider an aircraft clutched by a powerful updraft; airspeed is decreasing, altitude is increasing. What is the pilot's natural reaction to such an encounter? His instinct tells him to firewall the throttles, push the yoke forward, and begin trimming nose down. But consider the consequences of this configuration when the aircraft suddenly enters a downdraft of equal magnitude in the same cell. Now the aircraft is being thrust earthward at horrendous rates of descent, at high power settings, and with large increments of nose-down trim. Pilot control inputs may become futile. The elevator won't respond and there is a good probability that the mistrimmed stabilizer will jam from airloads generated by the accelerated descent. The result could well be that numbers one and four engines separate from the aircraft as it passes critical mach and the aircraft plummets toward a Kansas wheat field.

In a downdraft, followed by an

updraft, a pilot's natural reaction would be to retard the throttles, bring back the yoke, and put in lots of nose-up trim to slow the undesired descent. But in such a configuration, sudden entry into an updraft would place the aircraft in a precarious predicament. Strong drafts, forward aircraft speed, and increasing load factors can combine to increase the aircraft's angle of attack beyond the stall point. A dilemma such as this, compounded with low power and lots of nose-up trim, will induce a stall from which recovery in a thunderstorm may not be possible.



For thunderstorms or turbulent penetrations, flight manuals generally recommend trimming the aircraft to zero stick force consistent with turbulence penetration altitude and airspeed. Once this trim setting is established, it should not be changed for the duration of the penetration. Turbulent penetration airspeed and cruise airspeed are fairly close in most aircraft, and corresponding stabilizer trim settings for these airspeeds won't vary more than a fraction of a degree.

Whenever cruise power is established, make it a habit to note the trim position indicator and check this setting periodically. If turbulence is encountered, the trim will be just about right for the penetration. Keep in mind that power is probably already set at cruise and trim is nearly optimum, so concentrate on the attitude indicator and look for an exit.

Pilots can minimize the possibility of stall or structural damage in such turbulence by "riding it out." Using the attitude indicator as a reference, attempt to limit pitch oscillations to plus or minus five or ten degrees from normal (or to Dash One pitch limits). Use elevator inputs to keep the bird within the desired pitch bands but under no circumstances should you attempt to control attitude with stabilizer trim. If the autopilot is engaged, continue to use it but disconnect altitude or mach hold functions. If you don't, these functions will attempt to maintain a barometric altitude or indicated mach and will automatically trim the horizontal stabilizer. Be ready to fly the aircraft manually because autopilot disconnect is likely during turbulent flights.

**At Cruise Ceiling**

Encounters with thunderstorms or clear air turbulence at or near the aircraft cruise ceiling are more risky still. In this flight regime, low speed (stall) and high speed (structural limits) are fairly close to cruise or turbulent air penetration speeds (mach) and such limitations allow little maneuvering at high altitude.

This regime has often been referred to as "coffin corner." Flying a little above cruise speed at such an altitude could result in exceeding structural limitation speeds; flying at airspeeds below cruise may mean partial or complete stall, depending on bank and load factors. Moderate or severe turbulence in the coffin corner could wipe out meager controllability and maneuverability margins and amplify aircraft control problems. So what can a pilot do to improve aircraft control?

Decreasing altitude is one of the best methods. Descending 4,000 feet will nearly double the controllability margin over stall. A 300,000 pound C-141 cruising at .74 mach at flight level 390 has about a 30 knot margin over stall speed. At flight level 350, the same C-141 is approximately 60 knots above stall speed. At flight level 310, the stall margin is about 100 knots.

With approximately 44,000 thunderstorms occurring daily (16,000,000 annually) around the world, chances are that some pilots at this moment may be struggling to keep their aircraft under control within a turbulent cell.

Tomorrow may be your turn. Be certain that you know what to do.

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**750,000**

436 MAW 437 MAW

**500,000**

60 MAW 63 MAW
76 MAS

**400,000**

75 MAS 89 MAW

**300,000**

3 MAS 14 MAS
7 MAS 41 MAS

**250,000**

62 MAW 99 MAS

**200,000**

4 MAS 30 MAS
15 MAS 86 MAS
20 MAS 98 MAS

**120,000**

22 MAS

**100,000**

1 ACGS 54 WRS
6 MAS 55 WRS
9 MAS 57 MAS
40 ARRW 939 MAG
53 MAS (Assoc)

E MAC FLYER

# OF HONOR

JANUARY 1974

## 25 YEARS OR MORE

89 MAW  98 MAS  99 MAS

## 20 THROUGH 24 YEARS

76 ARRS  76 MAS  1605 ABW

## 10 THROUGH 19 YEARS

60 MAW Spt Flt Ops
438 MAW Msn Spt
436 ABG
137 MAG (ANG)
1 ACGS
3 MAS
7 MAS
14 MAS
41 ARRS
41 MAS
54 WRS
54 ARRS
57 MAS
67 ARRS
75 MAS
301 ARRS (AFRes)
303 ARRS (AFRes)
305 ARRS (AFRes)
Det 1, 39 ARRW
Det 4, 39 ARRW
Det 10, 39 ARRW
Det 5, 43 ARRS
Det 15, 43 ARRS
Det 18, 43 ARRS

# HF Hangups

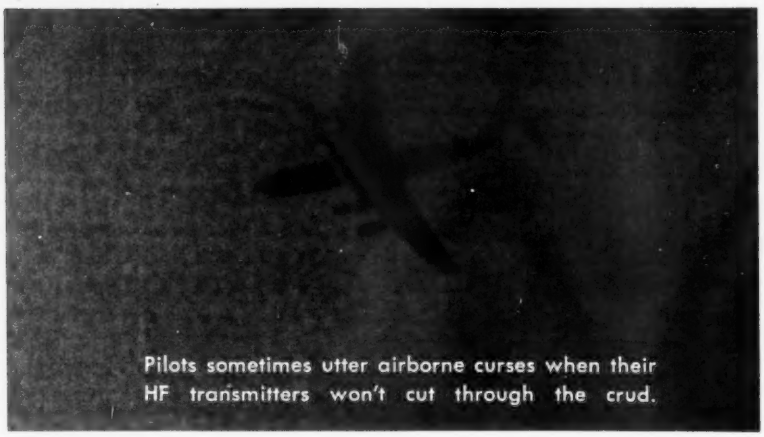
## Some tips on getting the message through when atmospheric conditions become your worst enemy.

Ever been frustrated by garbaged-up HF frequencies when you're trying to get an AIREP through? Join the club. But don't despair. Sometimes you can beat the static and fadeouts by applying a little electronic know-how. Read on and see if you can't pick up some tips to use the next time you're out.

**Propagation**

When a transmittal signal leaves the HF antenna, part of its RF energy remains near the earth's surface. This is termed a ground wave. Standard broadcast stations use the ground wave over distances of around 100 miles. As the operating frequency is increased the ground wave signals are attenuated. Consequently, ground waves are of little use except for local communications up to about 100 miles and on frequencies below 4 MHz.

The bulk of HF communications are by means of the sky wave. This wave leaves the transmitting antenna and travels upward on a path that would continue into outer space. However, some 60 to 200 miles above the earth's surface, the sky wave will hit the ionosphere and bend downward. This is because the ionosphere is composed of ions and electrons in sufficient quantities to act as a giant "mirror" which reflects radio signals of certain frequencies back to earth, often at distances many thousands of miles from the point of transmission.



Pilots sometimes utter airborne curses when their HF transmitters won't cut through the crud.

The reflection or absorption of sky wave signals reaching the ionosphere is largely a function of frequency. The highest frequency reflected back to earth is called the Maximum Usable Frequency (MUF). The best HF communications are obtained when using a frequency as close to the MUF as possible.

Fluctuations in ionospheric density will produce variations in the MUF. The most noticeable variations will exist between day and night, though differences will

also exist between summer and winter, and between solar maximums and minimums. A general rule of thumb is that the higher frequencies (10 to 30 MHz) will be usable during the day, lower frequencies (2 to 10 MHz) will be usable at night. However, during the summer months, the higher frequencies (10 to 30 MHz) will usually remain "open" throughout the night. During winter months, the higher frequencies deteriorate around sunset, at which time the lower frequencies (2 to 10 MHz) improve greatly, with their signals having tremendous strengths over very long paths.

During periods of maximum sunspot activity, the maximum usable frequency will be generally higher. During periods of minimum sunspot activity, since the ionosphere will be less dense, its lower reflectance will cause the maximum usable frequency to be generally lower. We're now reaching a solar minimum which is expected to bottom out in late '74 — early '75.

Another characteristic of HF communication is long-term fading. Each radio wave reflected by the ionosphere is affected, with a slight difference. During fading, signal strength may decrease or increase at rates from several times a second to once every few minutes, with the latter being more typical. Fading may be very different for two frequencies relatively close to each other. Known more specifically as selective fading, this phenomenon is most pronounced on transmissions below 6 MHz. Severe fading may often be eliminated by going to another operating frequency.

**Propagation Forecasts**

During the 15th minute of every hour, WWV gives voice announcements on short-term HF propagation forecasts. While these forecasts are for the North Atlantic transmission paths, they will apply in general to the northern hemisphere. These broadcasts will consist of a letter and a numeral. The letter applies to general propagation conditions: N — normal, U — unsettled, and W — disturbed.

The number refers to the conditions forecast for the next six hours and is defined as follows:

1 — useless
2 — very poor
3 — poor
4 — poor to fair
5 — fair
6 — fair to good
7 — good
8 — very good
9 — excellent

If the propagation forecast is 5 or less for the assigned frequency and you cannot make contact with airways, select another frequency allocated to the area being worked.

Two more points: Occasionally a station may not immediately respond to your call. This does not necessarily mean that the ground operator hasn't heard you, but that he may be "working" another station that you can't hear because of "skip." If you wait a few minutes and repeat the call, you might have more success.

Also, it will help if you state your transmitting frequency when trying to make contact. Since the operator is monitoring several frequencies, stating the one you are on will eliminate the need for him to try several before getting the right one.

With this background in mind, you should be able to "get through" with greater ease the next time you say, "Loring, this is MAC 90025, AIREP, over."

— Adapted from FLIGHT DECK

Apply some tricks of the trade and save time.

# Sling Wing Things

A helicopter's "wings" undergo many lift variations which help keep the bird right side up.

The terms "flapping" and "blade stall" are often heard during discussions of helicopter aerodynamics and sometimes cause confusion because they relate to a most intricate part of the machine.

Flapping and blade stall are related. But while flapping in itself is a routine function, blade stall is one of the more serious problems that pilots may encounter.

Flapping, simply defined, is the up and down movement of the rotor blades during rotation. Blade stall is due to the disruption of lift across a large area of the retreating main rotor blades.

Pilots would find it difficult, if not impossible, to keep their craft aloft without some means to compensate for lift asymmetry between advancing and retreating blades. On most helicopters this method of compensation, which permits lift symmetry and delays blade stall onset at low airspeeds, is flapping.

A brief review of these two functions and how they relate to each other could prove beneficial to helicopter pilots who haven't explored the subjects since helicopter training.

### Flapping

In a no-wind hover, lift generated by advancing rotor blades is balanced by an equal amount of lift on the retreating blades. But in forward flight, the advancing blade creates much more lift than the retreating blade. The lift differential between these two blades would cause imbalance if

there wasn't some mechanical means to offset it. By providing a means of vertical displacement, or "flapping," of rotor blades during forward flight, lift equalization between advancing and retreating blades is permitted.

The relative wind acting upon the blade in forward flight consists of two components: the velocity caused by the rotation of the blades around the rotor hub (Vrot), and the wind velocity created by forward aircraft movement (Vfwd). These variable wind components created many asymmetrical lift problems in early helicopters, but the invention of a flapping hinge solved many of them.

A flapping hinge allows the blades to flap individually and, thus, automatically compensates for the dissymmetry of lift that results from forward flight. This flapping action reduces the angle of attack on the advancing blade and increases the angle of attack on the retreating blade. As the rotor turns counterclockwise, the position of maximum up flapping is induced at 12 o'clock and felt at the 9 o'clock position. The position of maximum down flapping is induced at the 6 o'clock position and felt at the 3 o'clock position relative to the helicopter's forward axis. Thus, the blade angle of attack is decreased at the 3 o'clock position and increased at the 9 o'clock position.

The simple sketch in Figure 1 illustrates how the relative wind affecting the advancing blade differs from that affecting the retreating blade. The varied angles of attack of the blades cause different amounts of lift. Flapping action occurs mechanically once it is induced by control inputs and equalizes lift on the advancing and retreating sectors of the rotor disc. At high airspeeds, mechanical restraints on the rotor system limit blade flapping in order to meet structural and vibration limitations. When airspeed is increased beyond established limitations, or additional G-loads are applied, lift deteriorates abruptly on the retreating blades and causes the onset of "blade stall."

**Blade Stall**

In forward flight, there are large variations between the angles of attack on advancing blades and those on retreating blade sections. The small angles of attack on the advancing blade and the larger angles on the retreating blade are responsible for positive lift. Due to the slower blade rotation and reverse airflow near the hub on the retreating blade, little lift is produced from the hub outward to a certain point. The angle of attack on the blade, near the hub, is negative. But as it progresses out along the retreating blade, the angle of attack becomes less negative. Finally, the blade angle of attack becomes positive, resulting in an area of positive lift. This positive angle continues increasing until reaching the blade tip. Here it reaches a configuration that causes the blade tip to stall during forward flight. This stalled area works itself inward toward

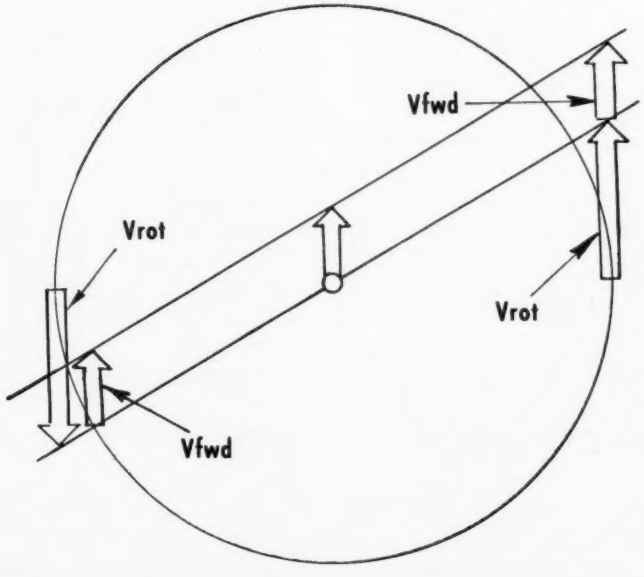



Figure 1 Relative wind differences.

# Sling Wing Things

the hub as airspeed is increased.

A retreating blade on which the stalled area is working inward could lead to uncontrollable flight if conditions inducing the stall are continued, e.g. turbulence and abrupt control inputs at high airspeeds. Retreating blade stalls result when a blade section exceeds the stall angle of attack. This condition occurs on the retreating blade, since in order to develop the same lift as the advancing blade, the retreating blade must operate at a greater angle of attack. As blade pitch or forward speed is increased, the stalled portion of the retreating rotor disc becomes larger as the stall progresses inboard along the retreating blade. The blade stall occurs as the blade passes through the 8 o'clock to the 7 o'clock position relative to the nose of the aircraft. (Figure 2)

The wide variation in blade angle results in variations of lift and drag coefficients, but the overall lift force on the rotor disc is equalized by blade flapping. However, the drag variation is not completely eliminated and this accounts for the vibration of the rotor system.

**Recognizing Blade Stall**

Retreating blade stall can be recognized by rotor roughness, erratic stick forces, vibration, and stick shake with a frequency determined by the number of blades and rotor speed. For instance, each blade of a five-bladed rotor will stall as it passes through the stall region. The stall creates a vibration of five beats per revolution. A fully developed blade stall will cause an abrupt pitch-up and possible loss of control.

Any condition that results in high retreating blade angles of attack can produce retreating blade stall. Such conditions include: high airspeed, low rotor r.p.m., high gross weight, high density altitude, high G-forces, turbulence, and abrupt control movements.

Recovery from a blade stall is made by decreasing the blade angle of attack below that of the stall angle. This can be accomplished by one or a combination of the following: decreasing collective pitch, decreasing airspeed, increasing rotor r.p.m., decreasing the severity of the maneuver (reducing G-loads), and decreasing control movements.

There is always a forward speed at which the retreating blade will stall, and limitations on forward airspeed are imposed because of this.

Vibrations in a helicopter are important. Learning to read and understand a helicopter's vibration language is a necessary part of the sling wing pilot's life.

— Adapted from FLIGHT COMMENT

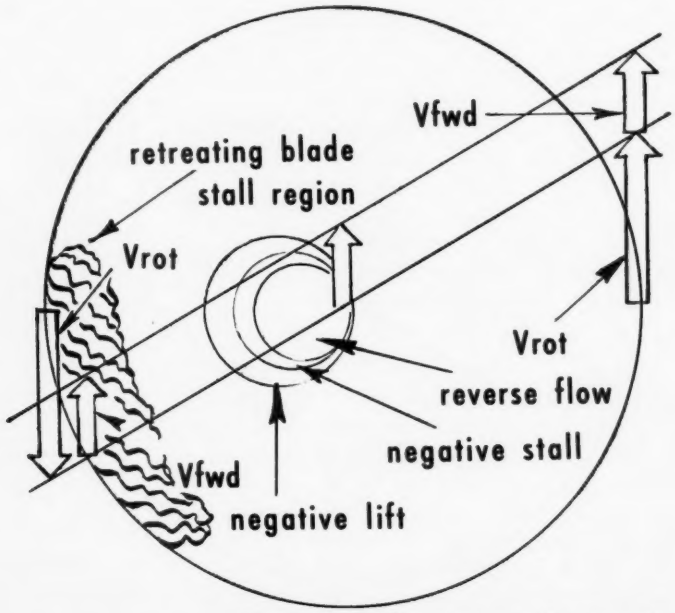



Figure 2 Stall regions on the rotor disc.

# The Perfect Pilot

## (for navigator eyes only)

The guy up front or in the left seat is not immune to error. A presumption that a pilot is fail-safe may catch you with your dividers down.

by Maj Kay A. Yingling
53d Military Airlift Squadron
Norton AFB, California

Have you ever flown with the perfect pilot? The one who is totally unerring and infallible? The one you trust so much that you can just sit back and enjoy his work? Do you have a nominee for the title? I think all we navigators have a nominee since navigators are, or should be, the foremost experts in evaluating pilot capabilities; even more so than a "check" pilot who flies only occasionally with your nominee. If a navigator is on a "hard" crew, flying with the same crew members all the time, he gradually cultivates a trust that his pilot will do things right, and will relax somewhat when he flies with him.

If he flies with different pilots frequently, he doesn't necessarily have this trust — or at least shouldn't have. He doesn't know the pilot well enough. Either way, having too much trust in your pilot is a false sense of security. The absolutely perfect pilot does not exist; neither does the perfect crew member — so blind reliance on any crew member is not the way to fly. Your pilot may make a mistake someday — a mistake you may be able to prevent.

**Prevent? — How?**

You could begin by monitoring the most dangerous areas of flight. Departures and approaches are an excellent place to start. On either, you are usually in a congested area with a swarm of other aircraft waiting to land or depart. These are the times to be watching; navigation doesn't start after departure and end when you pass over the VOR at your home field. These are also the phases of flight in which the pilot could use a little help. Someone who could help monitor headings and altitudes would come in handy.

Besides flying instruments, the pilot must watch for other aircraft. It isn't easy to watch flight instruments, engine instruments, an approach chart, local traffic, and operate radios all at one time. The navigator should be alert and helpful — by silently overseeing the operation. No need to interrupt the control tower's landing instructions. You can monitor all headings and altitudes from your seat and you usually have additional aids like radar and an absolute altimeter. Any course or altitude errors can be caught immediately.

Unfortunately, there are navigators around that think a letdown plate is something used to serve in-flight lunches. Do you understand all the symbols and directions given on these charts? If not, today would be a good day to learn. On your next flight, astound your pilot with your knowledge of instrument departures and approaches. You may be convinced that the fellow in the front seat doesn't really have such an easy job after all. Remember, the perfect pilot simply does not exist.

— THE NAVIGATOR

# Honeycomb — For You and the Bees

## It's light weight and strong – but don't puncture it with your size 10 foot.

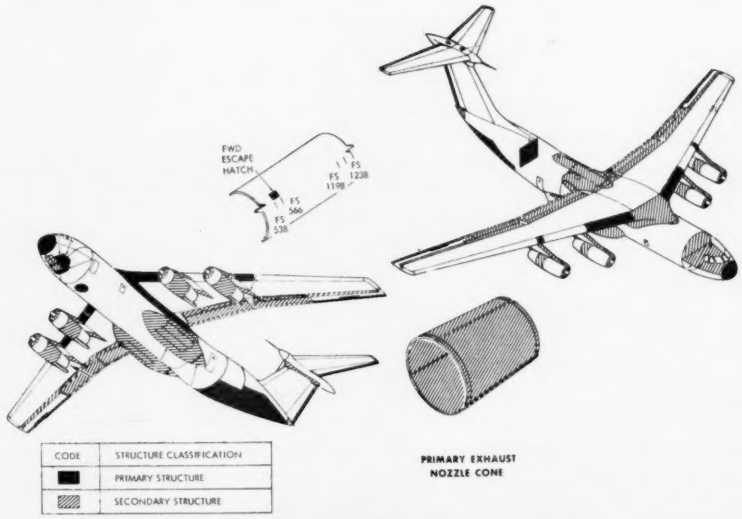
by Maj Thomas D. Simenson
WRALC/MMHO
Warner Robbins AFB, Ga

Honeycomb - Honeycomb — made by bees for bees. True! Also, made by builders of airplanes where a relatively high strength, low weight ratio is required. It can be destroyed by mechanics, flight crews, and flight line servicing personnel who aren't aware of the honeycomb portions of their airplanes or don't understand the inherent weakness associated with it.

Don't be too hard on yourself if you don't recognize it on your bird. It looks like normal aluminum skin. The difference is beneath the surface, with honeycombed aluminum replacing the conventional supporting structure.

It could also be compared to a bundle of soda straws packed and glued together and then cut into sheets of a desired thickness with the straws at right angles to the surface and a thin sheet of paper glued to both sides. You would then have a sheet of paper honeycomb paneling similar in structure to metal honeycomb on aircraft. This paper honeycomb panel would be light and relatively strong, and if pressure were applied evenly, it would have a high strength for such a low weight. However, it would puncture easily if a sharp object bumped it. Metal honeycomb, similar to the soda straw honeycomb analogy, is used extensively on the C-141 as shown by the illustration (extracted from T.O. 1C-141A-3).

Next time you see a "NO STEP" consider that it may be one of these special honeycomb panels. If it is honeycomb and you inadvertently set the edge of your heel, tool box, ball peen hammer, or spanner on it, you may start a process of decay below the thin skin that may go unrecognized for a time but will eventually lead to a required panel change. Unfortunately, honeycomb repair cost is extremely high. Once a penetration or dent occurs and the honeycomb is broken from the skin, moisture gets in and performs a methodical delamination process with each flight through repeated freezings and thawing cycles.




AREAS OF PRIMARY AND SECONDARY HONEYCOMB STRUCTURE

Surprises await the Aerial Ace following a speaking engagement at the Downtown Ladies Group.

# C.R. TERROR

C. R. had been a hit. Sweet applause, that soothing balm, still rang in his ears. He smiled. He bowed curtly. He shook his head in feigned modesty. As he finally waddled reluctantly off the stage, he missed the last step and almost plunged headlong into his audience.

"Oh, Major Terror, your talk was so exciting. We never get to travel to such places and have such excitement." The sloe-eyed blond had side-stepped to avoid C. R.'s stumbling bulk. Now she blinked her long dark lashes.

"Thank you, m'dear," grinned the bandy-legged bachelor, regaining his balance. His eyes widened at the sight of this sweet young thing in mini-skirt. "T'was only a few of my worldly experiences. Let me —"

But it was no use. C. R.'s enthusiastic audience denied him the luxury of focusing on any one of them, and he was suddenly surrounded by chattering members of the Downtown Ladies Group.

In a few minutes the Master of Oratory was happily sipping sherry to the hum of female voices. The women were rapidly firing questions at their guest speaker.

"Yes, it definitely requires precision and intelligence to fly — and a certain amount of physical dexterity," C. R. was saying — "The Vietnam War, well — about our national budget — yes, another drop of sherry if you don't mind —"

"Major Terror," a voice said quietly, you look so familiar but I can't seem to remember where I have seen you. Are you from Downtown Air Force Base?"

# C.R. TERROR

C. R. smiled. He might have looked familiar to some of the women. But with his $400 hair piece atop an otherwise shining dome, brand new wide lapeled suit, and a sudden talent for oratory, even his wing commander would have been hard pressed to recognize C. R.

"Yes, m'dear," he answered. Turning to face his questioner, the Airway Lothario's heart skipped a beat. It was the sloe-eyed blond again. This time, he thought, I won't let her get away.

The blond smiled politely, pulled her foot from under C. R.'s size ten's, and stepped back a little to what she considered a safe distance.

"Your flying stories were fascinating, Major Terror." The full lips from which these words emanated likewise fascinated the Great One.

"Just call me C. R.," he offered, the throbbing of a quickening pulse evident in his pounding temple. "Really, I didn't go into detail. Didn't want to scare the ladies."

Her eyes sparked with interest. "I would like to hear more." The voice was sultry.

C. R. gulped his sherry. "Well, my most exciting experience was during a takeoff from Honolulu International, right on the beach at Waikiki. I was flying a C-141, er, that's the world's most difficult airplane to fly. One of the engines quit before we got off the runway, but by skillful manipulation I got it off the ground. The first time that had ever been done."

The young lady's eyes widened. "You took off with one engine not operating?"

"Yep," continued C. R., cutting his eyes around to take in her astonishment, "but that wasn't anything. Another engine quit at 1,000 feet and then the copilot started getting dizzy spells he was so scared, so we had to pull him out of the right seat — that's where copilots sit."

"Er, yes, I'm aware of that," the woman answered.

C. R. thought he noticed her smile slightly.

"Well, about the time we got the copilot out of the seat, what should appear but a fire warning light on number four. There we were, three thousand feet, two engines shut down, grossed out with cargo, no copilot, and a fire light on number four."

"How terrible. What did you do?"

The group of women listened intently. This story was more exciting than any C. R. had told while on stage. They moved in closer as the Master Story Teller went on.

C. R. threw his host of admirers a pittance of a smile and continued. "With two down, two to go, and one with a fire light, I knew we were in hurtsville, and had to act fast. I pulled back the power on number four, racked it around to a tight downwind, and landed on the beach as thousands of frightened beachcombers watched."

There were oohs and aahs, but not from the sloe-eyed one.

"Did you land on the beach or at Honolulu International?" she asked abruptly.

"Well, ah, actually, the airport is practically on the beach. Same thing," C. R. reasoned, puzzled at the question.

"But isn't it against Air Force regulations to take off a four-engine aircraft with only three engines operating?"

"Well, er, actually, it was kind of a priority mission and we had to get off. Would've caused problems if we hadn't." This doll sure seems interested in my story, thought C. R., his collar now feeling just a little tight. He didn't like the way she asked questions. Too much like a wing commander.

"I was just wondering," Miss Sloe-Eyed continued, "and did you say you had a fire on number four engine, or was it just an overheat light. You did say you shut the engine down, didn't you?"

"Just throttled back." C. R. rubbed his head nervously and, to his dismay, felt his hair piece moving around with each rub.

"Did you think of trying to get one of the other engines back on the line?"

This is ridiculous, thought C. R. The color of his face was changing to that of a freshly dug beet. Perspiration began to flow.

"Yeah, got one back and landed it good, anyway." By now the back of his bald dome was showing as the hair piece continued its slippery journey toward C. R.'s arched eyebrows. The Teller of Tales thought he heard muffled giggles from some of the women behind him.

"Now I understand." Her voice

once again synchronized with her soft appearance. "For a moment I thought you were flying the C-141 around on one engine, a feat that you and I know is impossible, the thrust-weight ratio being what it is on a loaded Starlifter during high ambient conditions."

"No, I mean, yes, it couldn't be done — least ways, not just by anybody. Hmmph."

"What aircraft have you flown, Major Terror, I mean besides the Starlifter?" she asked.

The question had the same warming effect as if she had just plugged C. R. into a three-phase inverter system. His orbs uncaged with returning confidence.

"Funny you should ask that question. As I was telling this copilot of mine the other day, I probably have more meaningful flying time than any pilot in the Military Airlift Command today," C. R. pronounced, swaying back and forth with an air befitting an office seeker, "but none of the aircraft would mean anything to you — no offense intended, my dear — because you wouldn't know about such things. For instance, I have flown the world's largest aircraft, the C-5, the world's most durable helicopter, the H-43 Huskie, the world's most famous reciprocating transport, the C-124 Globemaster. I could go on for hours but now about—"

"I would imagine flying a synchropter with a jet engine, like the Huskie, would prove quite a challenge," the young woman broke in. "But flying the Galaxie with four TF-39 jet engines must be a pilot's dream. Not taking anything away from the Globemaster and its durable old 4360 engines, but they are getting rather old. Are the Globemasters still in service?"

C. R. had just crammed a cookie into his mouth and suddenly was seized by a coughing spell. The blond was slapping him vigorously on his back when a matronly lady, still agog at C. R.'s stories, stepped forward.

"Major Terror, I meant to introduce you two earlier. But I see that you've already met Miss Emily Airheart. You know, you two have a lot in common. Miss Airheart flew an airplane of some kind once, didn't you, dear."

"She did, er, you did," spurted C. R., turning to Miss Airheart, "When? I mean, how come?"

The young woman suppressed a giggle at the sight of the surprised C. R. readjusting his hair piece.

"Well, at one time, I was in the jet test program at Keehkol Aircraft, and test piloted a variety of jet aircraft and helicopters while completing my doctorate in aeronautical engineering."

C. R. gulped loudly, startling the matronly woman who had somehow managed to get her foot trapped under that of the Master Manipulator.

"I knew you two would get on just fine," the woman intoned, struggling to free herself from his immobile anchors, "so the rest of us will just run along and let you talk for a few minutes."

C. R.'s hue had returned to its usual ivory tone and he managed an uncertain smile. Sloe-Eyed smiled back.

"Major Terror, you are truly a marvel. It has been entertaining, and fascinating, to have talked with you. I hope we can discuss flying again, sometime."

The Suave One tuned in like a well trained pointer.

"Actually," he ventured, "I'm driving up to McDovertown to the air show this weekend. Er, ah, care to come along — just for the ride, of course. And we could talk about airplanes."

Sloe-Eyed was silent for a moment, obviously mentally calculating the offer. Then her eyes peered up from beneath those long eyelashes.

"First, I need to know one thing," she said. C. R. smiled confidently, anticipating a question concerning his marital status. "Did you ever have an aircraft accident?"

Paunchus Pilot's mouth dropped open.

"Ahh, ahh, what do you want to know something like that for? That's not fair," he mumbled, quite wounded.

"In that case, I think I had better do the driving," she purred.

# Quick Stoppers

## Some Kind of Nut

A C-130 driver was about to advance throttles on final but number three throttle would not go much beyond flight idle. Engine instruments indicated normal. The pilot suspected a malfunction in the throttle linkage and shut down the engine.

Maintenance personnel found the cause of the bound throttle — a one-half inch nut lodged in the throttle cable pulley guide.

That nut just grew itself a pair of legs, hopped on board the Herky Bird, spotted a neat place in the throttle quadrant, and shinnied down number three throttle cable to this cozy spot.

## It Does Happen

The EB-57 rolled out on downwind. The pilot lowered the landing gear handle, but the right main wheel would not indicate down. Mobile control informed the pilot that the right main gear was still up.

The mobile controller radioed Dash One emergency gear extension procedures while the pilot tried unsuccessfully to get the wheel down. With fuel running low, the pilot requested a foamed runway for a gear-up landing.

The aircraft touched down at the beginning of the 1,600 feet of foam, slid 1,900 feet, and stopped on the dry portion of the runway. Both crew men quickly got out of their lame bird without injury.

Failure of a bolt holding the striker plate had caused the gear to remain up. The striker plate fell off and prevented proper sequencing of the gear when the inner gear door opened. Although the crew had no control over the materiel failure, they did utilize proper procedures and prevented injury to themselves and major damage to the aircraft.

## One Emergency After Another

The engine of an airplane is only one of many places where FOD can create serious problems. Sometimes, FOD appears in the most unlikely places.

A T-29 pilot on a local training flight had just shot a touch and go when the flight mechanic noticed the left engine oil temperature increasing. A quick scan of the engine revealed smoke streaming from the left augmentor tube. As the oil pressure dropped to 55 p.s.i., the crew feathered the propeller and landed at a nearby base.

End of problem? Not quite. As the aircraft rolled down the runway, tower advised the crew that the left main gear was smoking. The pilot brought the aircraft to a quick halt and crew and passengers were evacuated within minutes.

The pilot hadn't used brakes during the initial landing roll, so it seemed a little strange when maintenance personnel discovered the left outboard tire had a flat spot and large hole in it.

But a closer look at the left brake solved the mystery. A bolt had lodged in the wheel housing, causing the brake to lock.

## Speeding Tank

During a C-5 onload-offload exercise at a southern base, a 100,000 pound Army tank rolled over the ramp crest at excessive speed — for a tank. As it came down, the forward ramp and ramp extension flexed and buckled.

After the exercise was over, the crew tried to close the visor door (hinged nose). The visor started down but hit the forward ramp extension and ground jack pads, damaging the visor ribs.

Investigators found that the tank apparently had damaged the ramp extension actuator brackets. The damaged actuators prevented the ramp extension from fully stowing, and as the visor was lowered, the ramp extension leaned forward and contacted the descending visor.

The C-5 and other MAC birds have all kind of doors that move in strange ways — up and down, in and out, rotating and folding. Ground scanners and loadmasters should continually scan door opening and closing operations to prevent such costly crunches.

## Skidding Sidestep

Another T-39 has fallen victim to slippery runway and gusty winds, touching down in a crosswind and blowing snow on a wet 10,000-foot runway. The winds were 80 degrees off the runway heading, gusting up to 19 knots. The pilot used minimum-run landing techniques and at approximately 60 knots the left main tire failed. The aircraft veered left and, due to hydroplaning, the pilot could not maintain directional control. The T-39 departed the runway, crossed over a concrete light base, and came to stop with the right main gear strut twisted beyond limits. The aircraft rested 15 feet from the runway, at the 4,500 foot remaining point.

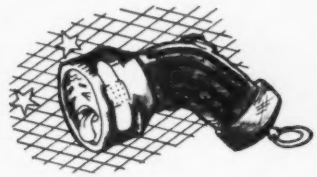
With no anti-skid braking or reverse thrust on the T-39, pilots must be highly proficient in slippery runway landing procedures to prevent skids and blown tires.

## FOD Fuel

Maintenance personnel inspected the jet engine inlet and signed off the inspection prior to ground run.

Shortly after the maintenance man engaged the starter switch, the ground scanner reported sparks showering from the tailpipe.

Inspection revealed damage to the visible turbine blades. Some particles in the bleed valve told the story — the hungry jet engine had swallowed a flashlight.



The person who left the FOD shares the responsibility for a multi-thousand dollar repair bill with the person who "inspected" and signed it off.

## *Pressurization and Insulation*

All systems appeared normal as the C-135 climbed through 25,000 feet. Then, suddenly, the cabin pressure rose to 24,000 feet. The pilot immediately descended to 10,000 feet and used manual procedures to steady the cabin pressure at 4,000 feet. This worked for about five minutes when, without warning, the cabin altitude again shot up to 10,000 feet.

The pilot aborted the mission and returned the aircraft to the base. Maintenance specialists found the problem — a piece of aircraft insulation lodged in the cabin pressure control outflow valve in the forward fuselage. This restriction prevented proper valve operation. The stray piece of insulation was removed and the aircraft pressurization system was, once again, "alfa-one."

## *Spark-arc*

The pilot and navigator studied the radar presentation as their aircraft entered clouds at FL 060. The nearest thunderstorm indicated by radar was 15 miles away, but a loud bang startled the crew as lightning struck the center windshield. The electric bolt escaped from the aircraft at the HF antenna and the number three propeller, breaking the antenna, nicking the propeller, and damaging the prop valve housing.

There's no way to overemphasize the hazards associated with thunderstorms and lightning. In spite of their precautions, crews sometimes find themselves bottled up in a thunderstorm. In this case clouds masked the cell from the radar scope.

Obviously, the best cure for such an occurrence is to stay in the clear, but that isn't always possible. Talking to other crews who have flown your intended route often identifies hazardous areas. Another old trick is listening to the lower ADF frequencies for tell-tale static which can indicate that lightning is in the area. The needle often swings toward lightning.

Meteorologists and your radar set occasionally need help from you. So use all the tricks you know to avoid the shock of your life.

# after deadline . . .

DANGEROUS CARGO HANDLING -- When 20,000 pounds of Class A plastic explosives were rejected by the aircrew because of numerous discrepancies, one of the men delivering the materials dropped his 50 pound box on the pavement to demonstrate its safety. The flight crew was relieved that it didn't explode, but they decided the incident, which was one of a series of blunders, warranted a Serious Safety Hazard Report.

Here are some of the discrepancies:

* The explosives were packed in cardboard boxes, some of which were broken open.

* The DD Form 1387-2 was missing.

* The net explosives weight was not indicated on a document or on the containers.

* The truck was parked within 50 feet of transient alert, base ops, and the passenger terminal. The planned onload site was within 300 feet of these buildings.

The crew first became suspicious when the ten tons of explosives arrived on a leased (U-Haul) commercial vehicle driven by unidentified civilians.

This incident occurred on a non-Air Force installation and is a reminder that onloading or offloading at strange bases may present unexpected hazards requiring extra aircrew vigilance. Fortunately, this MAC crew was aware of their responsibilities and halted the slipshod operation before it resulted in a conflagration.

FREE PALLET -- As a C-141 taxied out for takeoff, the number four pallet slipped through the locks, slid across the otherwise empty Starlifter floor, and hit the up and locked rollers on the number ten pallet position. The rollers absorbed the shock and shot back against the pressure door -- poking three pencil size holes in the door. The checklist spells out the loadmaster's responsibility for checking the pallet locking mechanisms. Considerable damage can result from cargo sliding around in the cargo compartment.



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